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(54) Screen clamp

(57) A basket 1 of vibratory screening apparatus comprises inflatable means 3 positioned to overlie a part of a screen member 5, 7 mounted in the basket. Inflation of the inflatable means 3 causes it to press against a screen frame 7 of the screen member, clamping it against a support 9, 29 of the basket 1.

Preferably the inflatable means 3 is deflatable and a reservoir 19 may be provided for vented inflation fluid.

The screen member may be pre- or post-tensioned.

The basket may comprise supports and inflatable means positioned to press against parts of the screen member remote from its periphery.

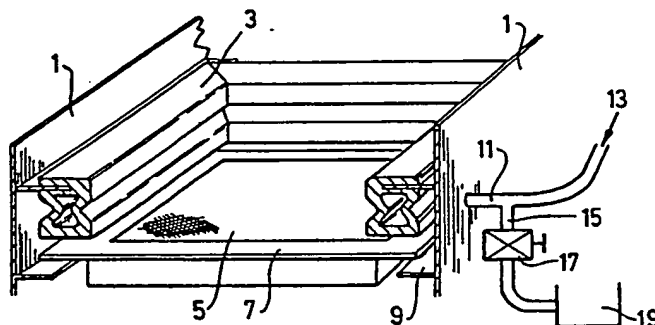


Fig.1

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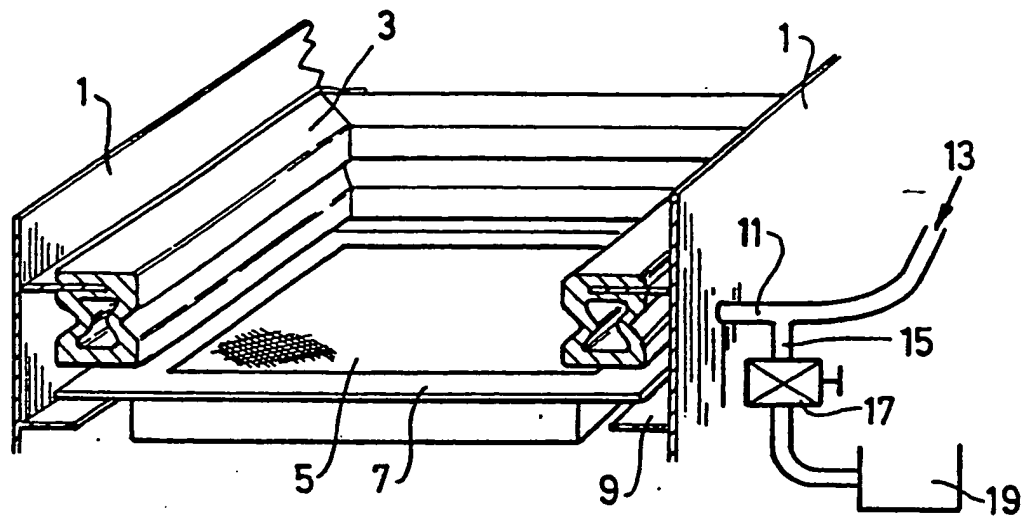


Fig. 1

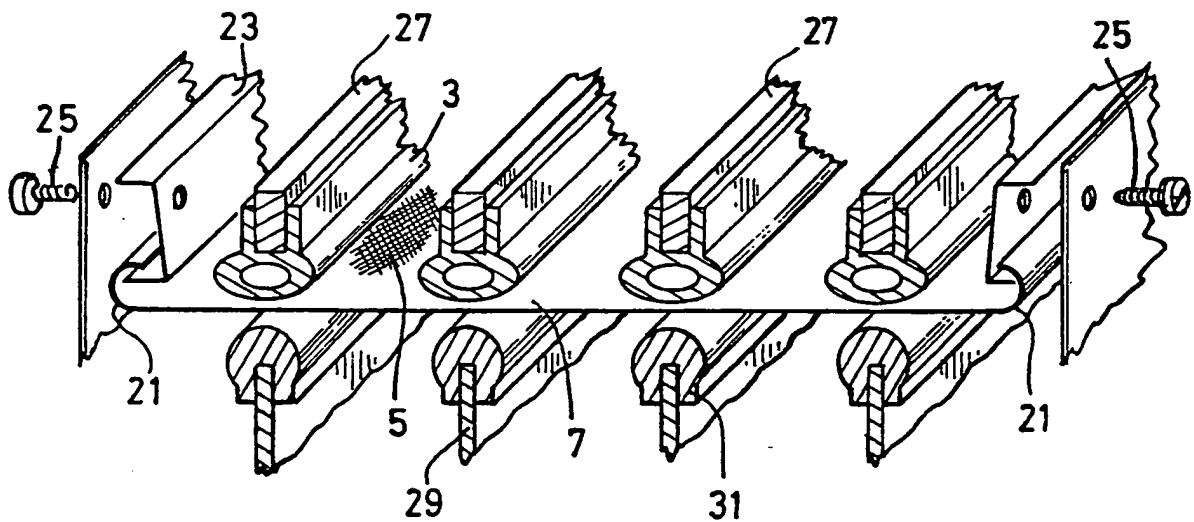
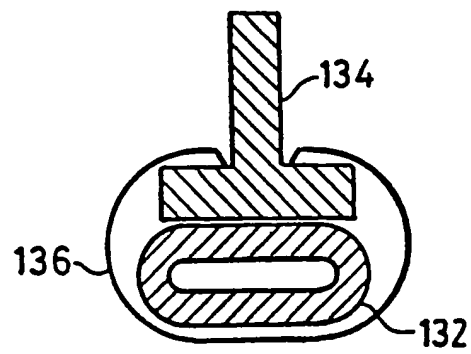
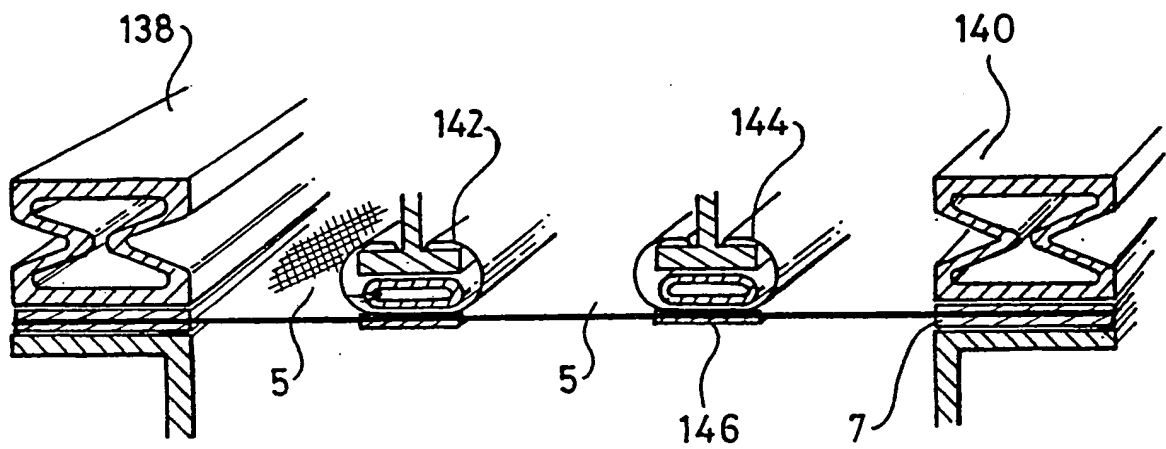


Fig. 2

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*Fig. 3**Fig. 4*

SPECIFICATION

Improved screen clamp

5 *Field of invention*

This invention concerns the mounting of screens in vibratory apparatus such as is used for the sifting of mud and the like materials derived from oil-well drilling.

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Background to the invention

It is known to mount a screen in a frame and mount the latter in a basket mounted within a machine housing and adapted to be oscillated or otherwise vibrated as by a cam drive mechanism.

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For servicing and replacement it is desirable to be able to remove the screen and its associated frame where provided from the machine and to this end the latter is adapted to be slid into and out of the basket and clamping means is provided to hold the frame and screen in position. Clearly it is desirable that the clamping shall be effected as quickly as possible to reduce down time.

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It is known to make the frame for the screen inflatable, in order to provide a means for tensioning the screen within the vibratory apparatus. In EP-A-0130744 there is proposed a screen having an inflatable screen frame which on inflation both tensions the screen and clamps it in position in the screening device. However, this arrangement is of limited application. Since the inflation of the screen frame both clamps the screen in position and tensions it, the arrangement cannot be used with screens which are to be tensioned in some other manner such as by a tensioning clip or screw on the basket of the vibratory apparatus or which are pre-tensioned within a rigid frame. Additionally, since the same act of inflation both clamps the screen and tensions it, the clamping force and the tensioning force cannot be controlled independently. Finally, it is necessary for each screen to be associated with its own respective clamping arrangement, since this is incorporated in the screen frame, even when the screen is not mounted within a vibratory screening apparatus, and thus it is necessary to fabricate as many inflatable frames as there are screens.

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It is therefore an object of the present invention to provide an improved clamping mechanism.

50 *Summary of the invention*

In accordance with the present invention in a first aspect there is provided vibratory screening apparatus in which a screen member may be mounted, the apparatus having inflatable means located within it to overlie at least a part of a screen member mounted in the apparatus so that inflation of the inflatable means clamps the screen member in place.

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In accordance with the present invention in a second aspect there is provided a method of clamping a screen member in place in a vibratory screening apparatus, the apparatus comprising inflatable means located within it to overlie at least a part of a screen member mounted in the apparatus, in which the inflatable means is inflated when the screen member is in place so as to clamp the screen

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member.

The inflatable means may comprise one or more inflatable members.

Preferably the inflatable means overlies at least a part of the edge region of the screen member.

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The screen member may or may not include a screen frame in which the actual screen is located. However, in normal use a screen member comprising a screen in a frame will be used and the screen member designed or selected so that the inflatable means of the vibratory screening apparatus acts on the screen frame and not on the screen itself.

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Normally, the inflatable means will be located within a basket of the vibratory screening apparatus in which basket the screen member may be mounted.

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The screen may be inserted into the apparatus untensioned, and be tensioned subsequently (post-tensioning) against the body of the vibratory apparatus. Alternatively, if the screen is located in a frame, and this may take the form of pre-tensioning the screen against the screen frame before insertion into the vibratory apparatus. Embodiments of the present invention may be used with pre-tensioned screens or post-tensioned screens. Our earlier applications GB-A-2161715 and GB-A-2162091 disclose permanently pre-tensioned screens with which embodiments of the present invention may be used.

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Preferably means is provided to enable the inflated member to be deflated to enable the screen member to be withdrawn for servicing or replacement.

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The inflatable member may for example be in the form of an elastomeric stocking which is secured to edge regions of the screen member supporting structure of the vibratory apparatus so as to overlie the peripheral region of the screen member. When it is inflated and enlarged the increased cross-section of the stocking pushes firmly against the upper (or lower) surface of the frame and screen and clamps it securely in position against the underside (or topside) supporting structure.

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Conveniently the stocking extends around at least three sides of the frame and preferably also the fourth side.

Means for inflating the stocking or other device may be mounted on and form an integral part of the overall apparatus or a pressurized fluid or airline connection may be provided on the stocking or connected to the stocking so as to enable the latter to be inflated from a separate air supply or hydraulic fluid supply.

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Whichever arrangement is used there is preferably also provided a venting device by which the pressure in the stocking can be relieved. Where the inflating fluid is a hydraulic oil or other liquid the venting device preferably communicates with a reservoir of the liquid so that as the latter is exhausted from the stocking the oil can be returned to a common reservoir and is thereby saved.

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Embodiments of the present invention, given by way of non-limitative examples, will now be described with reference to the accompanying drawings, in which:

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Figure 1 is a schematic sectional view of a first embodiment of the present invention; and

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Figure 2 is a schematic sectional view of a second

embodiment of the present invention.

Figure 3 is an end view of another form of inflatable hose; and

Figure 4 is an end view of a screen assembly utilising different hose types.

Detailed description of the drawings

Figure 1 shows a basket 1 of vibratory screening apparatus in which is located an expansible elastomeric member 3. A removable screen member comprising a screen 5 and a screen frame 7 is mounted within the basket 1 and supported by lateral projections 9 of the basket.

The lateral projections 9 support the screen member immediately below the elastomeric member 3. The elastomeric member is secured to the basket at its upper side, so that inflation of the elastomeric member causes it to expand downwardly and press the screen member against the lateral projections 9 so as to hold the screen member firmly in place in the basket 1. The vertical spacing between members has been exaggerated in Figure 1 (and also in Figure 2) for clarity.

The elastomeric member 3 extends around the periphery only of the area defined by the basket 1. The screen frame 7 forms the periphery of the screen member, and when the elastomeric member 3 is inflated it presses against the screen frame 7 only, and does not contact the screen 5.

A supply line 11 is provided in order to convey pressurised air, hydraulic oil or other suitable medium, to the elastomeric member 3, as indicated by the arrow 13, in order to inflate it. The supply line 11 has a branch 15 leading to a pressure relief valve 17, whereby the inflation pressure in the inflatable member may be relieved and the member may be deflated. This releases the clamping effect on the screen member, so that it may be removed for replacement or cleaning.

When the inflation medium for the elastomeric member 3 is not air, it may be desirable to collect it as it is exhausted from the member 3 through the valve 17. Accordingly, the branch line 15 is shown in Figure 1 to extend beyond the valve 17 to a reservoir 19 where vented inflation fluid may be collected.

Typically, the embodiment of Figure 1 will be used with screens which are pre-tensioned against their screen frames.

Figure 2 shows another embodiment of the present invention being used with a screen member in which the screen is tensioned after insertion into the basket. At the periphery of the screen member, the screen frame 7 terminates in a turned back edge to form a hook strip 21. A tension rail 23 is attached to the side wall of the basket 1 by a tension bolt 25. The hook strip 21 is hooked around a part of the tension rail 23 when the screen member is inserted into the basket, and tightening of the tension bolt 25 moves the tension rail outwardly towards the side wall 1 of the basket so as to tension the screen member.

In this embodiment, the basket 1 also has steel support members 27, 29 extending across the screen member. Normally, the screen member will be selected so that portions of the screen frame 7 are opposed to these support members 27, 29, with strips

of screen 5 in between.

The lower support members 29 terminate in solid rubber end pieces 31. The upper support members 27 terminate in hollow rubber end pieces which form inflatable members 3.

In order to clamp the screen member in position, the inflatable members 3 are inflated. On inflation, the members 3 expand and press the screen member downwardly against the rubber end pieces 31. In this way, the screen member is held securely between the upper and lower supports 27, 29 of the basket 21.

It should be noted that in Figure 2, the inflatable members 3 do not only extend alongside the walls of the basket 1 but also extend across the area defined by those walls in positions spaced therefrom.

Figure 3 shows a preferred hose design in which a flattened hose 132 is attached along a central linear region of its upper surface to the underside of a support member 134 and is held in place by a ring or the like 136. The latter may be elastic. The resilience of the ring 136 may help to deflate and flatten the hose 132 when the inflation fluid is vented.

Figure 4 shows how a combination of two different types of expansible hose can be used to secure a screen in place. The generally square section hoses 138, 140 serve to grip the opposed edge regions of the screen frame and the intermediate hoses 142, 144 are positioned across the width of the screen to engage stiffening ribs or other strengthening means 146, which may be parts of the screen frame 7 located at intervals across the screen.

As will be apparent to those skilled in the art, various modifications and further embodiments are possible.

CLAIMS

1. Vibratory screening apparatus in which a screen member may be mounted, the apparatus comprising inflatable means located within it to overlie at least a part of a screen member mounted in the apparatus so that inflation of the inflatable means clamps the screen member in place.

2. Vibratory screening apparatus according to claim 1 in which the inflatable means overlies at least a part of the periphery of a screen member mounted in the apparatus.

3. Vibratory screening apparatus according to claim 1 or claim 2 in which the inflatable means overlies a part of a screen member mounted in the apparatus which part is spaced from the periphery of the screen member.

4. Vibratory screening apparatus according to any one of the preceding claims which comprises support members for the screen member positioned in opposed pairs above and below the position of a screen member mounted in the apparatus, at least one of each said pair bearing an inflatable member of the said inflatable means.

5. Vibratory screening apparatus according to any one of the preceding claims which comprises means to inflate the said inflatable means.

6. Vibratory screening apparatus according to any one of the preceding claims in which the inflatable means is deflatable to release a clamped screen

member.

7. Vibratory screening apparatus according to claim 6 comprising a reservoir for inflation fluid exhausted from the inflatable means during a said deflation.
8. A method of clamping a screen member in place in a vibratory screening apparatus, the apparatus comprising inflatable means located within it to overlie at least a part of a screen member mounted in the apparatus, in which the inflatable means is inflated when the screen member is in place so as to clamp the screen member.
9. A method according to claim 8 in which the inflatable means overlies at least a part of the periphery of the screen member when the screen member is in place.
10. A method according to claim 8 or claim 9 in which the screen member comprises a screen located in a screen frame.
11. A method according to claim 10 in which the inflatable means, when deflated, presses against the screen frame and does not press against the screen.
12. A method according to claim 10 or claim 11 in which the screen is tensioned against the screen frame.
13. A method according to claim 12 in which the screen is tensioned against the screen frame before being mounted in the vibratory screening apparatus.
14. A method according to any one of claims 8 to 11 in which the screen member is tensioned against the vibratory screening apparatus after it has been mounted in the apparatus.
15. A method according to any one of claims 8 to 14 in which the inflatable means overlies a part of the screen member when the screen member is in place which part is spaced from the periphery of the screen member.
16. Vibratory screening apparatus substantially as herein described with reference to the accompanying drawings.
17. A method of clamping a screen member in vibratory screening apparatus substantially as herein described with reference to the accompanying drawings.